



Northamptonshire Archaeology

An archaeological desk-based assessment
and construction impact assessment of land along
Andrews Lane Rising Main Replacement
South Ferriby, North Lincolnshire



Northamptonshire Archaeology

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Northamptonshire
County Council

Appendices

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HAMMERHEAD®

Static Pipe Bursting Systems

***Faster, productive trenchless
pipe rehabilitation with minimal
above ground disruption.***

***For contractors paid by the foot,
not by the hour.***



HAMMERHEAD
Mole™

The Problem:

Worldwide deteriorating infrastructure

On an international scale, water, sewer, gas and other utilities are in need of replacement. Most are located in congested urban areas, under buildings, roadways or expensive landscape, and are surrounded by other utilities. Worldwide, many systems have exceeded their useful life, have deteriorated and are in need of replacement.

Estimated cost of utility replacement in the U.S. is a trillion dollars within the next 20 years. Replacement by traditional open-trench methods is often not a viable or cost effective alternative.



Water and Gas Lines

- Are encrusted, capacity is reduced
- Are corroded and leak - some systems experience a 40 percent water loss
- A 1/4" (6.4 mm) hole can leak more than 3,000 gallons (11,356 L) of water per day
- Are under capacity because of population growth



Sewer Lines

- Offset pipes, root intrusion and crowned and cracked pipes are causing system backups
- Are under capacity due to urban growth
- Infiltration and inflow (often from rain) are taxing treatment plant capacities - increasing treatment costs and creating outflows of untreated sanitary sewage into lakes and streams



Traditional open cut pipe replacement project

The Solution:

Pipe Bursting



Pipe Bursting can reduce excavation up to 85%



Advantages of Pipe Bursting include:

- Follows the existing utility path
- Reduces potential damage to adjacent utilities
- The preferred technology for up sizing existing pipes
- Reduces social costs and traffic disruption
- Installs new pipe versus repairing the existing pipe
- Reduces costs associated with utility relocation design

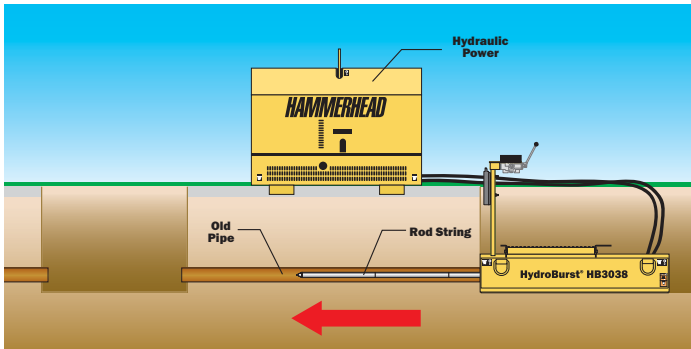
Water System Estimated Flow Rate Comparison†

Cast Iron Pipe	AC Pipe	New DIPS HDPE SDR11 Pipe	New DIPS HDPE SDR17 Pipe
4" ID = 96 gpm	4" ID = 109 gpm	4" = 113 gpm 6" = 234 gpm	4" = 132 gpm 6" = 272 gpm
6" ID = 217 gpm	6" ID = 247 gpm	6" = 234 gpm 8" = 405 gpm	6" = 272 gpm 8" = 472 gpm
8" ID = 340 gpm	8" ID = 388 gpm	8" = 405 gpm 10" = 606 gpm	8" = 472 gpm 10" = 705 gpm
10" ID = 511 gpm	10" ID = 583 gpm	10" = 606 gpm 12" = 857 gpm	10" = 705 gpm 12" = 997 gpm
12" ID = 723 gpm	12" ID = 824 gpm	12" = 857 gpm	12" = 997 gpm

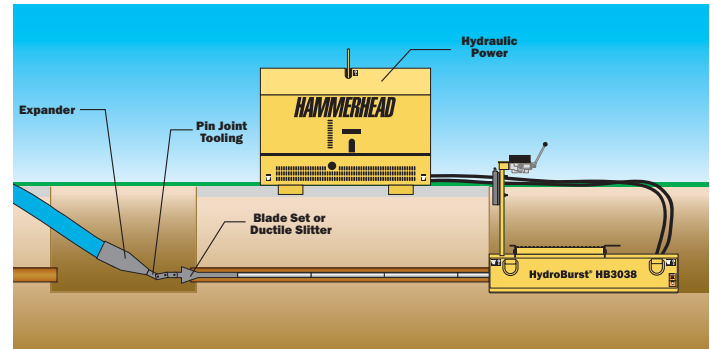
†Estimates based on flow estimate formula $Q = 2.449VD^2$ (where Q = gpm, V = velocity in ft/min, D = I.D. of HDPE DIPS pipe) Velocity calculated at a nominal 3 ft/sec (city mains operating at 2 - 3 ft/sec). Pressure drop per 1000' ranges from .32 psi/100' for 4" pipe to .10 psi/100' for 12" pipe.

Static Pipe Bursting Method and Pre-Chlorination

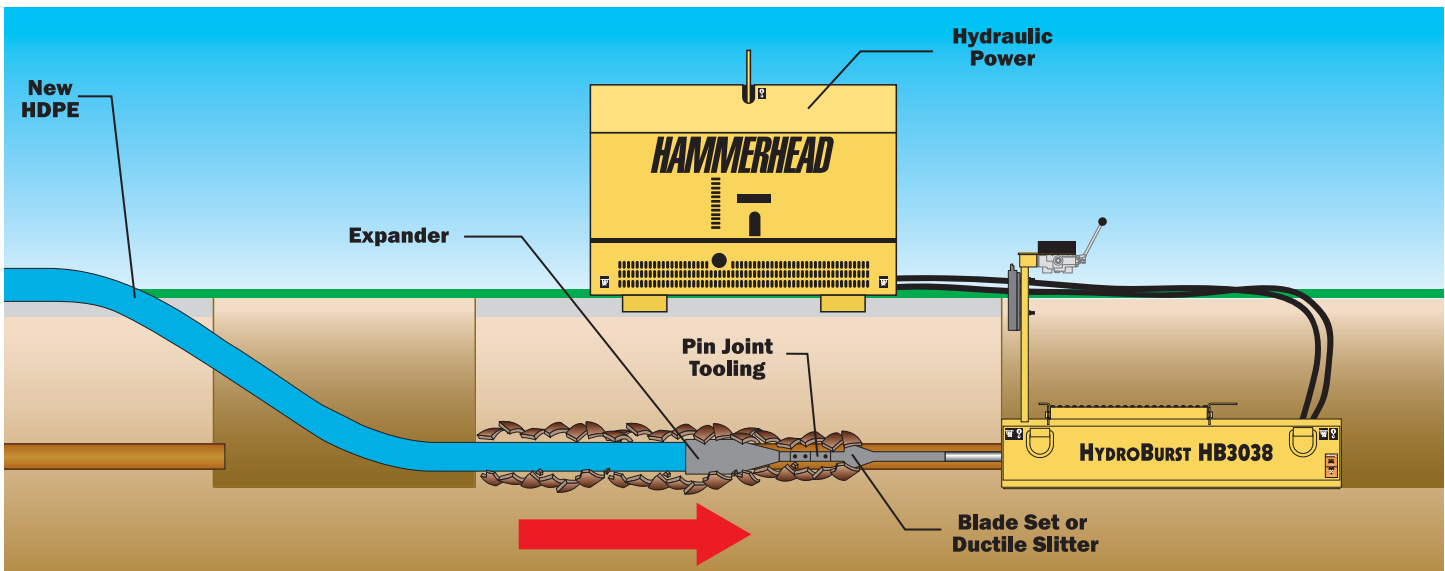
Pipe Replacement as Simple as 1 - 2 - 3



1 Payout Rod - payout the rod down the existing pipe. 350 feet of rod can be pushed out in approximately one hour. Rods can pass through sweeping bends in pressure pipe systems.



2 Attach to Tooling - Attach bursting blades or ductile slitter to the rod end. HDPE pipe is attached to an expander which is between 20 - 29% larger than the outside diameter of the pipe being installed.



3 Pull Back Product - During pull back, old pipe is fractured or split and pushed out into the surrounding soil. The new pipe is installed simultaneously. Pullback operation takes approximately one hour to install 350 feet of pipe.



The pre-chlorination method has been an industry standard in the UK and is rapidly gaining acceptance in North America. The pre-chlorination method is guided by AWWA standards for chlorinating and pressure testing HDPE water mains. What is the difference? The HDPE water main is chlorinated, pressure tested and sealed prior to installation. Once the new HDPE pipe passes bacterial and pressure testing, it can be installed via pipe bursting.*

Designed for the contractor that's paid by the foot, not by the hour. Compact hydraulically operated HydroBurst® systems can burst fractureable pipes and slit non fractureable pipes (ductile iron and steel). Systems are simple to set up and operate and provide some of the most advanced features in the trenchless industry. With HammerHead®, you have an expert global trenchless partner with service, support and training second to none.

*Please refer to AWWA standards for HDPE chlorination and pressure testing specifications.

HydroBurst® HB3038 and HB5058 Systems

Designed specifically for 2" (50 mm) - 8" (200 mm) gas and water line replacement. HB3038 and HB5058 systems are highly efficient, simple to set up, easy to operate and require a small pit for the machine. HB3038 and HB5058 systems are fast, a typical 400' (122 m) job takes only a two hour round trip from payout to completion.

HB3038 and HB5058 machines feature quick replacement jaw inserts, on board pressure gauges and an auto rod grip and release feature. Specially designed slitters are available for use when slitting 3" (75 mm), 4" (100 mm), and 6" (150 mm) ductile iron or steel.



HydroBurst® HB80 Bursting System 80 Tons of Static Pull Back Power

A powerful Static Machine for 85% of the Pipe Bursting Market (sewer, water, gas) 3" (75 mm) to 12" (300 mm) diameters

The HydroBurst® HB80 Pipe Bursting system is strategically designed for the contractor looking for a reliable and simple to operate machine that can be towed on a 12,000 lb (5,443 kg) trailer with a 1 ton truck and can complete 85% (both water and sewer projects) of the pipe bursting jobs bidding today.

The HB80 is very easy to transport to the job and on the job with a low weight of 2,800 lb (1,270 kg) for the pulling unit. The HB80 is designed with high productivity in mind with features like the auto rod spinner, fast 16 second payout per 35" (90 cm) rod shuttle speed, light weight rod, and 148' (45 m) of on board rod storage to provide a two hour calculated round trip 400' (122 m) burst. To maximize job performance the HB80 is coupled with a locked and sound proofed 73 HP Kubota® power supply with a 41 gpm (155 lpm) variable displacement pump for maximum pull power and cylinder shuttle speed.

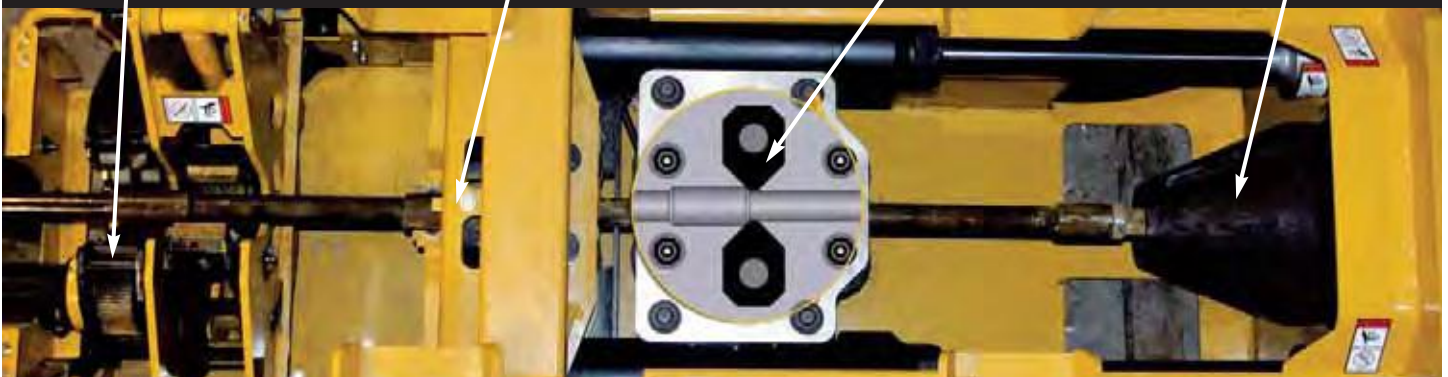


The optional Auto Rod Spinner quickly spins rods together to form a uniform pipe string.

Rod lock vice holds rod in place for constant tension on pipe string and shoring increasing overall production.

LIGHT WEIGHT ROD (27 lb/12.2 kg) proven API style threaded, heat treated rods include an upset OD feature for rod lock and positive grip systems.

On board burst head docking reduces pit length requirements (Up to 12")





HydroBurst® HB125: Another Industry First

125 Tons of Power for Your Big Jobs

The HydroBurst HB125 static Pipe Bursting system is designed for the contractor who wants **ONE** machine versatile enough to replace 4" (100 mm) to 20" (500 mm) diameter pipe, in water, gas and sewer markets.

The HB125 is considered the premier Pipe Bursting machine with many time saving features that reduce labor and improve job speed. Much of the design platform is based on a Pit-Launch HDD design using 125 tons of pull back with a simple one man operation.

The HB125 design targets the ability to quickly set the machine in place, hydraulically adjust the height and shore the rear of the machine, allowing you to rapidly begin rod payout.

The HydroBurst HB125 uses many of the proven designs from both the HDD market and oil field industries to provide a simple, reliable, high production machine that can handle most Pipe Bursting jobs on the market.



High Production System

- Simple one man operation
- On board rod basket
- 19 second rod payout per 39.37" (1 m) rod
- Three hour calculated burst time for a 400' (120 m) burst
- Quick set up with Hydraulic leveling jacks and rear stabilizer



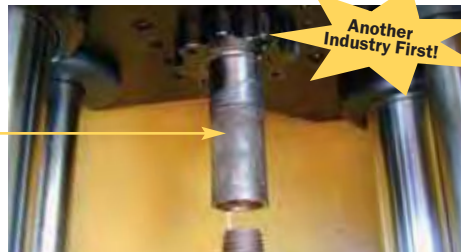
Burst Head Docking

Retractable vices can dock burst heads on projects up to 12" (300 mm) HDPE inside the machine at the end of a burst which allows for smaller pit requirements.



Proven Rod Design API Torque Joint

- LIGHT WEIGHT (52 lb/23.6 kg) and easy to load into machine
- 62.5' (19.0 m) bend radii for projects with sweeping bends
- Upset OD feature for rod lock system grip location
- Torqued joint design for high THRUST and PULLBACK capabilities



Auto Rod Spinner

- Quickly spins rods together to form a uniform pipe string
- Provides 800 ft/lbs (1,085 N-m) of rotational torque to rotate through collapsed lines (1,100 ft/lb breakout torque)



Rod Lock Vice

- Holds rod in place for constant tension on pipe string and shoring
- Increases production

Rear hydraulic stabilizer

- Quick rear shoring with one lever
- 36" (91.4 cm) of travel

Why Use HammerHead® Torqued Joint Rods?



Torqued rod strings are flexible for bursts around sweeping bends.

HydroBurst HB80 and HB125 static Pipe Bursting systems feature an API style threaded joint and heat treated alloy rod that has been proven in the oil fields and directional drilling for decades under thrust, pullback and bend radii conditions.

Durability for long life — A torqued joint rod string lends itself to the ability to handle thrust loads encountered when pushing around sweeping bends, through encrusted lines, line collapses and long burst lengths.

CAUTION: Other “loose joint” designs can buckle if not supported by the host pipe.

Typically when contractors look to purchase a static pipe bursting system, burst lengths of 400' (122 m) to 800' (244 m) are common and the cost and life of the rod weighs heavily in the cost of the equipment package. The nature of a round rod design lends itself to economical manufacturing costs which can be passed on to the contractor allowing for more competitive bidding and less equipment investment without compromising quality, durability and performance when compared to other rod concepts that use “loose joint” designs.

Rotation ability — Rotational torque is placed on the rod string when loads are applied either directly to the rod string by sweeping bends or unaccounted for pipe conditions, or as the bursting head, blade or cutter follows a pipe fracture. Round rods may be gripped at any location on the rod OD, relieving rotational load induced into the rod string.

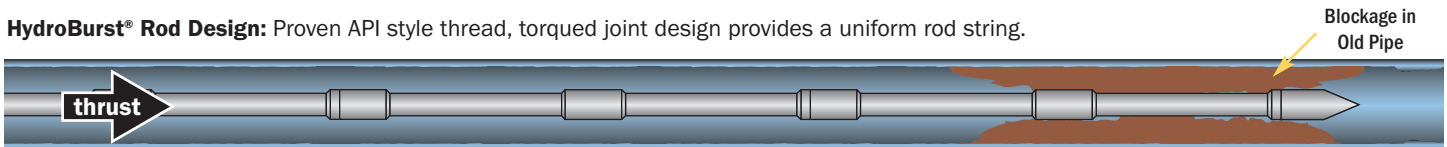
CAUTION: In a “loose joint” rod design system, any torque induced in the rod string during pull back has the potential to jam the pullback machine.

HydroBurst® Rod (Minimum Bend Radii)

Rod Diameter	HydroBurst® Model	Minimum Bend Radii*	Minimum Calculated Tensile Yield Strength
1.38" (3.5 cm)	HB3038/HB5058	16.3' (5.0 m)	41.6 tons
1.75" (4.4 cm)	HB3038	45.0' (13.7 m)	67.4 tons
2.00" (5.1 cm)	HB5058	31.3' (9.5 m)	89.6 tons
2.25" (5.7 cm)	HB80	26.3' (8.0 m)	148.7 tons
2.75" (7.0 cm)	HB125	62.5' (19.0 m)	179.5 tons

*Bend radius calculation includes a 25% design allowance factor.

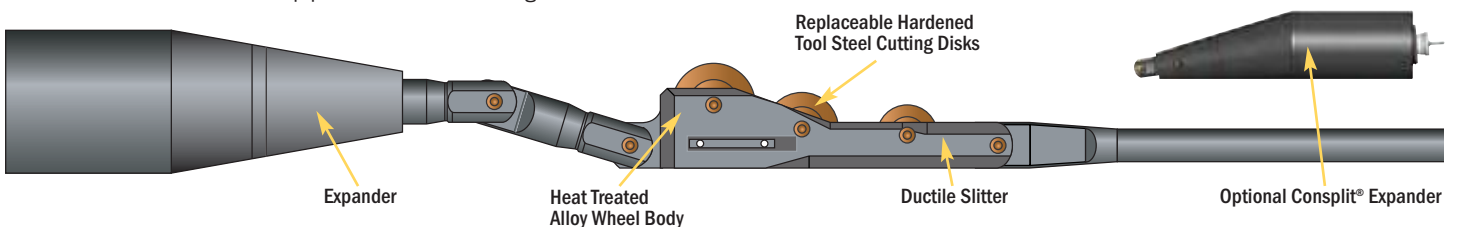
HydroBurst® Rod Design: Proven API style thread, torqued joint design provides a uniform rod string.



Ductile Iron and Steel Slitters and Consplit® Expanders

Specially designed slitters are available in 2" (50 mm) - 12" (300 mm) and feature hardened tool steel cutting disks that are durable and can slice through non-fracturable pipe such as ductile iron, steel and PVC while reducing required tonnage. The first cutting disk pre-slits the pipe, the second slits or bursts the pipe and the third cutting disk cuts

through bells, repair clamps and bolted style cast couplers. Consplit® Expanders have a conical design and help keep the expander in line with the host pipe. Consplit Expanders are available in a wide range of sizes to replace many pipe types and diameters.





More than 4 Million Feet of Pipe Installed in 34 Countries with HammerHead® Pipe Bursting Systems!



Everglades National Park, Florida

Pipe sizes: 2", 4", 6" (5, 10 and 15 cm) up sized to 4", 6" and 8" (10, 15 and 20 cm)
 Pipe type: Cast iron to HDPE
 Total footage: 25,000' (7,620 m)
 Equipment: HydroBurst HB3038



Mexico City, Mexico

Pipe sizes: 7.5 cm, 10 cm and 15 cm
 Pipe type: AC to HDPE
 Total footage: 43.5 Miles (70 km)
 Equipment: HydroBurst HB5058



Vancouver, Washington

Pipe sizes: 4" (10 cm) to 4" (10 cm) gas service with two locating wires
 Pipe type: Steel to HDPE
 Total footage: 700' (213 m)
 Equipment: HydroBurst HB5058 and 4" (10 cm) Ductile Slitter



Reims, France

Pipe sizes: 4" (10 cm) to 4.3" (11 cm)
 Pipe type: Cast iron to HDPE
 Total footage: 443' (135 m)
 Equipment: HydroBurst HB5058



Altendorf, Switzerland

Pipe sizes: 4" (10 cm) up sized to 5" (13 cm)
 Pipe type: Ductile iron to HDPE
 Total footage: 1,800' (549 m)
 Equipment: HydroBurst HB5058



Las Vegas, New Mexico

Pipe sizes: 6" (15 cm) up sized to 12" (30 cm)
 Pipe type: AC and cast-iron to HDPE
 Total footage: 625' (191 m)
 Equipment: HydroBurst HB125



Liverpool, United Kingdom

Pipe sizes: 3" (7.5 cm), 4" (10 cm) and 6" (15 cm)
 Pipe type: Cast iron to HDPE
 Total footage: 77.7 miles (125 km) per year
 Equipment: HydroBurst HB3038 and HB5058



Jubail, Saudi Arabia

Pipe sizes: 12" (30 cm) to 18" (45 cm)
 Pipe type: UPVC to HDPE
 Total footage: 14,764' (4,500 m)
 Equipment: HydroBurst HB125



Mukatcha, Ukraine

Pipe sizes: 4" (10 cm) to 6" (15 cm)
 Pipe type: Cast iron to HDPE
 Total footage: 3,300' (1,000 m)
 Equipment: HydroBurst HB3038



HammerHead HydroBurst Static Pipe Bursting Systems

Choose the Right System for Your Next Job

HydroBurst® Static Pipe Bursting Machine Specifications

	HB3038	HB5058	HB80	HB125
Pipe size replacement range - in (mm)	2 - 6 (50 - 150)	4 - 8 (100 - 200)	3 - 12 (75 - 300)	4 - 20 (100 - 500)
Rig Size L/W/H (in) top, (cm) bottom	60/20/12 152/51/30	65/22/13 165/56/33	82/33/36 208/84/91	125/47/min - 42, max - 49 318/119/min - 107, max - 124
Minimum Pit Size L/W/H (in) top, (cm) bottom	80/20/7 below pipe center line 203/51/18 below pipe center line	85/22/7 below pipe center line 216/56/18 below pipe center line	106/40/18.5 below pipe center line 269/102/47 below pipe center line	125/47/18 below pipe center line 318/119/46 below pipe center line
Weight	762 lb (345 kg)	928 lb (421 kg)	3,060 lb (1,388 kg)*	7,500 lb (3,402 kg)
Max. pulling force	38 tons	50 tons	80 tons	125 tons @ 4,420 psi
Shuttle speed (no-load, one cycle, approx. 1 m rod)	18 seconds	22 seconds	16 seconds	19 seconds
Spindle Torque	Manual	Manual	250 ft/lbs (339 N-m) (approximate)	800 ft/lb (1,085 N-m)
Rotational Speed	n/a	n/a	n/a	250 RPM
Stabilizers	n/a	n/a	Manual Rear Stabilizer	Hydraulic Vertical and Rear Stabilizers
Rod Spinner	n/a	n/a	Optional Accessory	Standard
Rod				
Diameter(s)/ Length(s)	a. 1.38" (35 mm)/39.38" (100 cm) b. 1.75" (45 mm)/39.38" (100 cm)	a. 1.38" (35 mm)/39.38" (100 cm) b. 2.00" (50 mm)/39.38" (100 cm)	2.25" (57 mm)/35.44" (90 cm)	2.75" (7 cm)/ 39.4" (100 cm)
Weight(s)	a. 17.2 lb (7.8 kg) b. 27.0 lb (12.2 kg)	a. 17.2 lb (7.8 kg) b. 35.0 lb (15.9 kg)	27.0 lb (12.2 kg)	ONLY 52 lb (23.6 kg)



20 HP Power Pack



73 HP Power Pack

HammerHead® Hydraulic Power Pack Specifications

Model	Engine	Pump Flow	Hydraulic Pressure Max (psi)	Length in (cm)	Width in (cm)	Height in (cm)	Weight lb (kg)
Power Pack 20	Kubota 20.3 hp (15.1 kw) @ 2,800 RPM	24 gpm (91 L/min) @ 2,800 RPM	3,000	52.5 (133)	23.5 (60)	41.5 (105)	690 (313)
Power Pack 73	Kubota 73 hp (54.4 kw) @ 2,600 RPM	41 gpm (155 L/min) @ 2,600 RPM	4,500	72 (183)	41 (104)	58 (147)	2,410 (1,093)



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Method Statement Work Sheet

Contract:	Sth Ferriby	Method Statement No:	MS001		
Name of Author:	Rod Young	Date:	Aug 2011		
Name of Approver:		Date:			
Method Statement Title:	Pipe Bursting				
Revisions:					
No:	Reason	Author	Date	Approved	Date

1.0 References

RA 001 Pipe Bursting
 Spec Sheet HB125 Hammerhead

2.0 Scope of Work

This method statement covers the works associated with the Pipe Bursting from the New River Ancholme along Sluice Rd (A1077) & farm land to AW STW located off Emine Street. The existing 300mm RM to be replaced with a 355mm SDR 17 pipe. The overall program for the works is 13 weeks.

3.0 Principal Health and Safety Considerations

The following job specific risks have been considered and addressed: -

- Only properly trained personnel will be used to carry out operations.
- All plant and materials will be removed from the work areas daily, being stored in the main compound, overnight and at weekends.
- The ground will be scanned with a CAT detector and trial holed to locate any buried services prior to excavation (see associated Risk Assessment).
- Falls into open excavations will be prevented by adequate edge protection.

- All excavations will be carried out to Barhale confined space procedures and permit to dig (see associated Risk Assessment).
- Particular attention will be paid to local residents / businesses who reside close to the works, and land owners.
- The team will be briefed on the Method Statement and Risk Assessment prior to starting work.

Significant hazards

Over Pumping

- No Over Pumping will be required, the existing PS pumps will be utilised.
- During installation of temporary over ground pipework, takers will operate from the PS to the STW.
- Details of the proposed pumping system to be approved by AW operations & TMC.
- Emergency call out numbers and arrangements will be in place before any over pumping commences.

Existing Buried Services

- Before excavations commence, the footprint of the works will be investigated for the location of underground services in conjunction with the utility companies and their records.
- Where possible, services will be located by electro-location and clearly marked on the ground.
- It will be the responsibility of site engineer and foreman to maintain the clarity of service markings on the surface and to re-scan the area with CAT detectors (or similar approved instruments) in advance of each day's excavation.
- Any damage or suspected damage to services will be reported immediately to the plant owner and left exposed for inspection.

Overhead Electric Cables

- **EDF on site for GS6 overhead cable survey;**
- Safe Horizontal Distance = tba m
- Safe Vertical Distance = tba m
- Cable Height = tba m
- Goal Post Height = tba m

Goals Posts will be erected prior to any excavations commencing.

Noise & Dust Control

- All plant used will be of recent manufacture with current noise / dust & emission controls fitted.
- Use of the existing PS pumps removes the requirement for over pumping pumps & power packs - a noise reduction.
- Use of pipe bursting instead of open-cut removes the amount of excavation to a minimal amount (by 95%) & thus the possible generated dust, & also the quantity of plant on site is reduced.
- Option of pipebursting reduces the lorry & plant movements.

Traffic Management

- Works done in the highways will be carried out under the appropriate traffic management and will be completely isolated from the surrounding areas by Heras fencing. Signing and guarding will be in accordance with Barhale, NRSWA and AW regulations. Care will be taken to ensure the safety of the public and for maintaining safe pedestrian walkways at all times.

4.0 Method

Pipe Bursting and Excavations

- The position of the excavation will be set out by the Site Engineer.
- The area around the excavation will be fenced to separate plant from public.
- A Permit to Dig will be issued to the works gang. This permit will have any known services marked.
- A CAT survey of the area will be carried out and all known services will be marked at ground level. Any services within the excavation area will be located by hand dug trial holes.
- A 13 tonne rubber tracked excavator will be used to excavate the pit under full banks man supervision to the level set out by the engineer.
- Edge protection will be in place at all times during the excavation.
- Trench sheets and Hydraulic frames will be installed during the excavation to provide ground support.
- Access and egress to the pits will be by tied ladder.
- Gas monitors and saver sets to be used when entering the excavation.
- Daily inspections will be carried out to insure that the ground support is intact.
- Reinstatement to the work area will be covered by a specific reinstatement method statement.

Pipe Bursting Operations

PLEASE SEE ATTACHED TYPICAL RISK ASSESSMENT AND METHOD STATEMENT

The pipe is to be delivered to site on articulated transport. This will be offloaded into the designated storage areas, provided by Barhale Construction

On Arrival to Site the Butt fusion machine and pod pull bursting rig, power pack and equipment will be off loaded and moved to its position on Site.

The pipe is to be welded into continuous length then moved into position on the day of the pipe bursting.

During the butt fusion operation, the print off sheet of each joint; the print off will be handed over to Barhale Construction, with a record sheet.

Barhale will excavate the launch and reception pits at 200m intervals. The Reception pit will be a minimum 2/2.5m wide and 4.5m long and the base will be constructed with a stone blinding layer 500mm below the invert, Launch pit will be 1.5m wide and three times the depth in length to form a slip trench.

The excavated material from the pits in the highway will be removed to the site compound by dumper & then removed from site by 6 or 8 wheel wagons, should any the material be suitable it will be reused for backfill. Otherwise the excavations will be backfilled as per HAUC.

The excavated material from the pits in the farm land will be stored adjacent to the pit (top soil & lower excavated material being stored separately) & used for backfilling of the pits.

All work in excavations will be classed as a category 1 Confined space and operatives working within these will have a top man, use a gas detector, carry an escape set and wear a full rescue harness.

Barhale will securely fence all pits with Herras Fencing.

The spread width proposed along the field section will be max. 12m, due to the construction method the spread will not be stripped of top soil.

Permit to Enter from Barhale Construction. GAS MONITOR TO BE LOWERED INTO CONFINED SPACE, CHECKED AND RECORDED, THEN THE ESCAPE SETS WILL BE LOWERED INTO MANHOLE/ EXCAVATION.

Once the excavated pits have been checked for stability and for gasses and is deemed safe to enter, then work may proceed.

The rig lowered into the pit and will set up the bursting rig within the reception pit.

The welded section of pipes will be towed from the storage area to the launch pit by Barhale. The excavator will be then be sited at the launch pit to control the line of the welded pipe during the installation works, to prevent the pipe kicking and damaging 3rd party property.

A steel rod is the passed through the sewer between the Launch and Reception pits. The bursting cone and new pipe is attached to the rod at the launch pit and is then fixed to the Bursting equipment already established at the reception pit.

The bursting cone now fixed to the steel rod is entered into the existing pipe where it is pulled forward. Behind the expander within the base of the launch pit the new continuous 355mm pipe is attached.

As the bursting cone is hydraulically pulled forward the existing fracturable pipe is forced into the compressible material creating an annulus sufficient for the new pipe. Pipe bursting is designed to replace a fracturable pipe in compressible material.

Pipe Bursting cannot guarantee success in situations where concrete surrounds, densely packed granular materials or narrow rock trenches (Non displaceable ground) are present. Expected rates of progress are 50m per hour, based on suitable ground conditions. Extremely cohesive soils and some sands can cause excessive skin friction, which may reduce progress and achievable bursting lengths, the ground has been assumed to be clay.

The duration for the bursting will be:-

- 1 day mob.
- 2 day pipe bursting.
- 1 day remob.

Pipe Bursting cannot rectify pipes originally laid to poor line and level.

The above process will be repeated for the rest of the pipe bursting, .

Barhale will complete all final reinstatements required to finished ground surfaces.

Operatives and supervisors within the work zones will be obliged to use ear defenders during noisy operations based on monitoring of similar operations – to establish threshold limits and noise levels at/away from workforce.

When in close proximity to the diesel power pack, ear defenders will be used

Vibration impact on operatives carrying out the works will also be considered and the guidelines set out in the Safe Operating Procedures/Policy for Vibration Generating Work Tools will be followed.

Potentially Noisy Operation

Hammerhead HB100 Rod Puller power pack 73dba

Or

Hammerhead BH125 Rod Puller power pack 82dba

Means of Control

Ear defenders to be used.

5.0 Plant and Equipment

- NRSWA approved fencing
- Chapter 8 Road Signs & cones
- Cable detection equipment
- 13 tonne Excavator
- 6 tonne dumper
- Sheet Piles

- Hydraulic Frames
- Gas Detectors
- Saver Sets
- Compressor

PIPE BURSTING MECHANICAL PLANT

- Hydraulic power pack
- Pipe bursting rig and equipment
- Butt fusion equipment
- Generator

MATERIALS

- 355mm ID SDR 17 MDPE Pipe

6.0 Other Considerations

Labour and Supervision

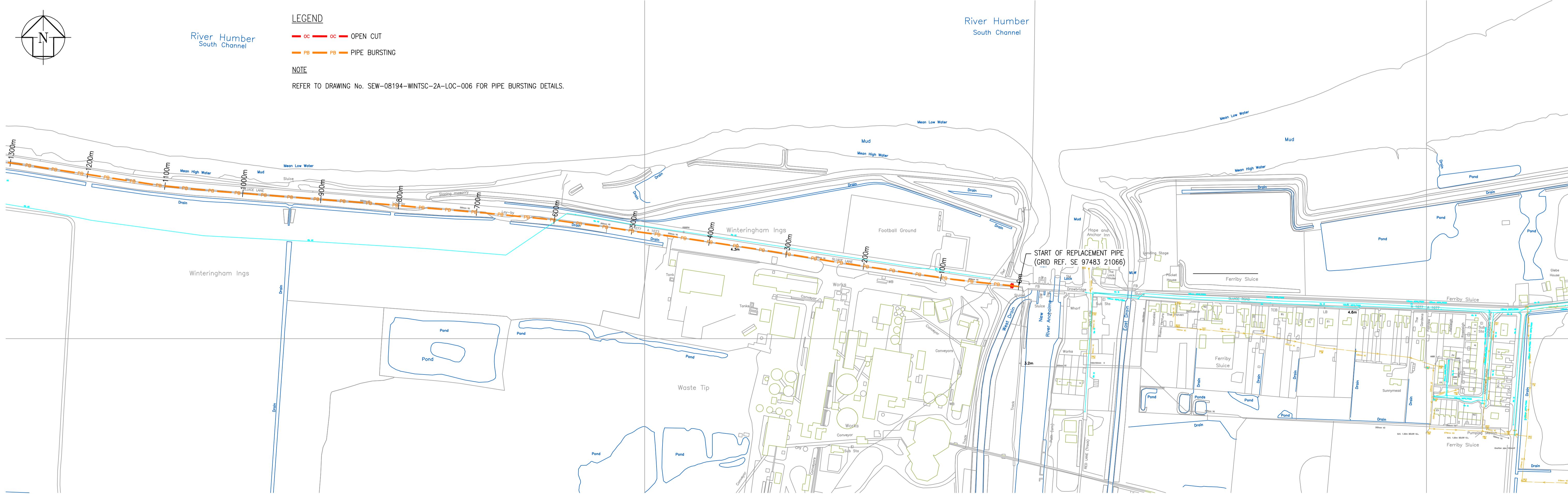
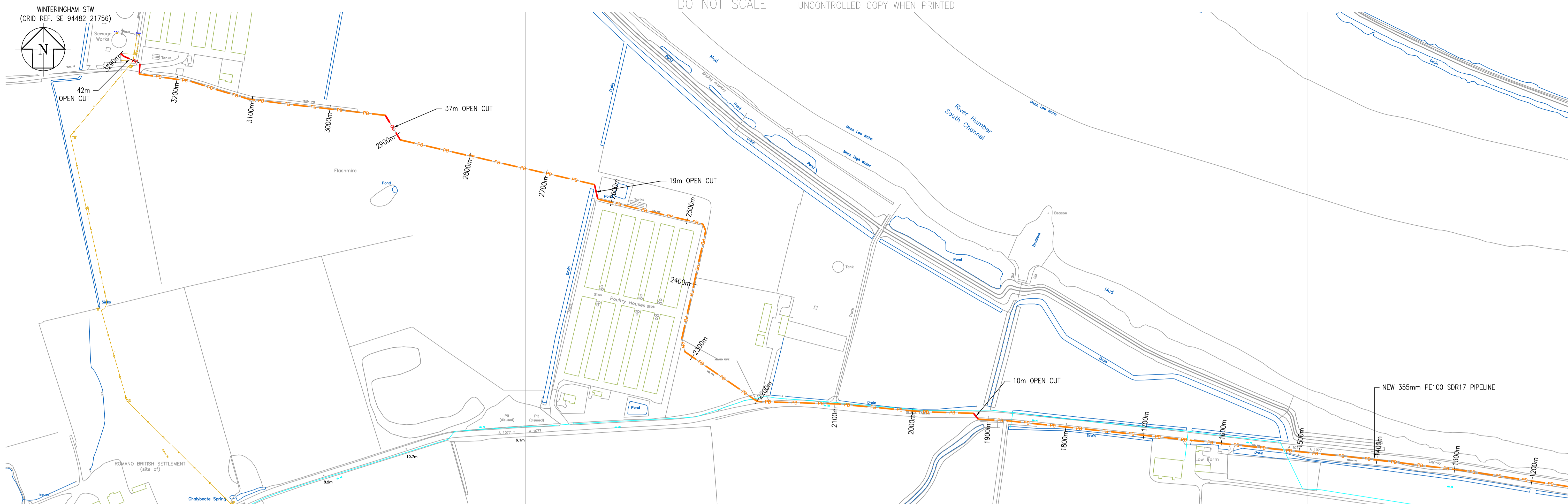
Site Agent

Foreman

General Operatives

Working Areas

The excavation works will be carried out within the confines of site barriers.



LEGEND
 OC OPEN CUT
 PB PIPE BURSTING

NOTE
 REFER TO DRAWING No. SEW-08194-WINTSC-2A-LOC-006 FOR PIPE BURSTING DETAILS.

P4	04.05.11	PIT LOCATIONS AND DIRECTIONAL DRILL ROUTE REMOVED.	RW	FI	TC
P3		PIPE ROUTE REVISED	RM	FI	
P2		ROUTE AMENDED	RM	FI	
P1	01.06.10	FOR INFORMATION	BB	FI	
REV	DATE	DETAILS	BY	STAT	CHK APP

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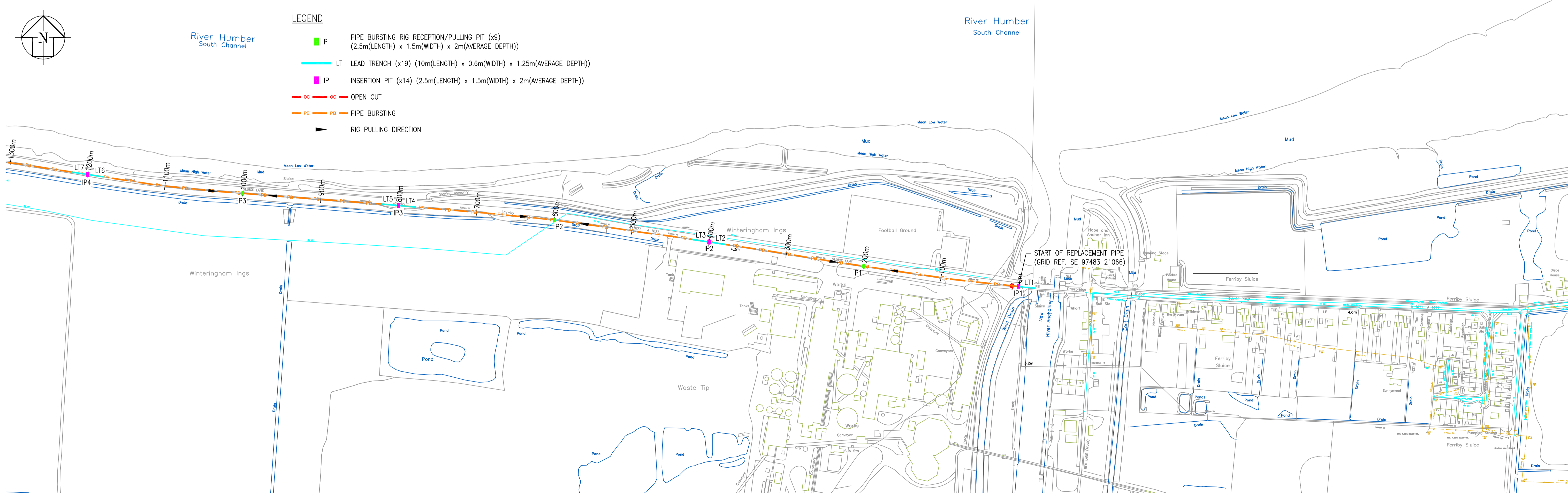
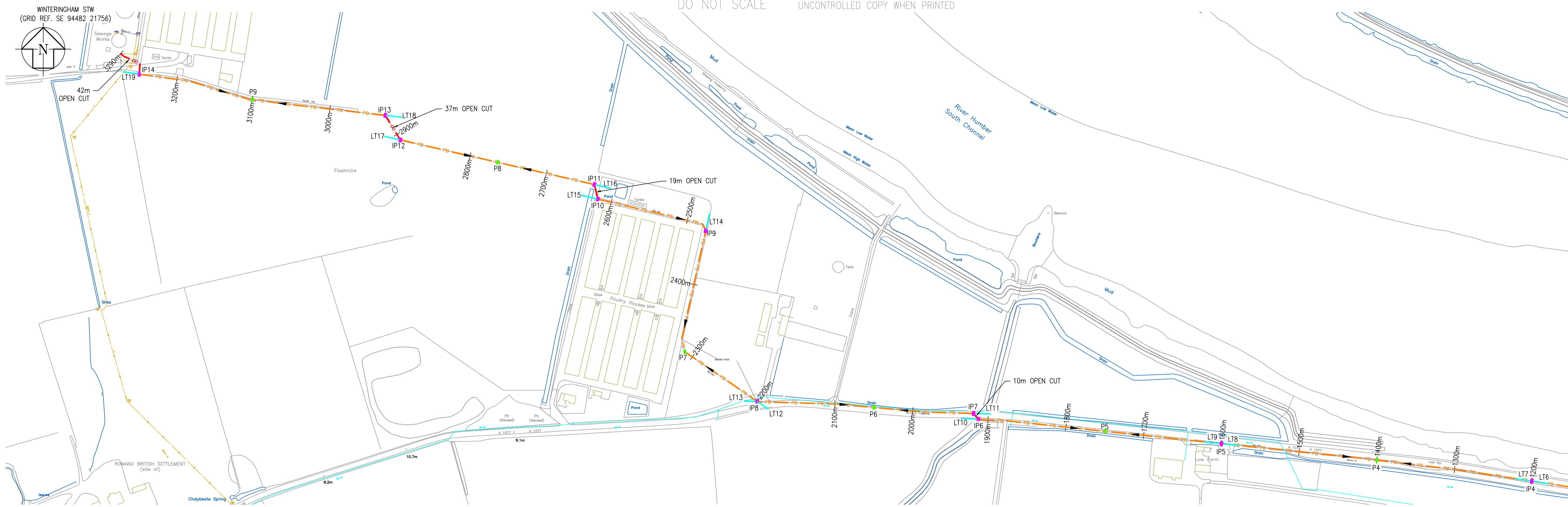
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 Cambridgeshire, PE3 6WF
 Tel: 01733 414100 Fax: 01733 414111

PROJECT TITLE
**SOUTH FERRIBY
 ST ANDREWS LANE TPS
 RISING MAIN REPLACEMENT SCHEME**
 Pipeline, general layout plan Fig A3.1

DRAWING TITLE
**LAYOUT PLAN - 355mm SDR17
 PIPELINE BY PIPE BURSTING**

DES'D: SG	DATE: 01.06.10	DRAWN: BB	DATE: 01.06.10	CHK'D: TC	DATE: 04.05.11	APP'D:	DATE:	
A1 SCALE: 1:2500		REFERENCED DRAWINGS: SEW-08194-XREF-RMS.dwg SEW-08194-XREF-MAP.dwg						
DRAWING No. SEW-08194-WINTSC-2A-LOC-002							REV. P4	STAT. FI



- LEGEND**
- P PIPE BURSTING RIG RECEPTION/PULLING PIT (x9) (2.5m(LENGTH) x 1.5m(WIDTH) x 2m(AVERAGE DEPTH))
 - LT LEAD TRENCH (x19) (10m(LENGTH) x 0.6m(WIDTH) x 1.25m(AVERAGE DEPTH))
 - IP INSERTION PIT (x14) (2.5m(LENGTH) x 1.5m(WIDTH) x 2m(AVERAGE DEPTH))
 - OC OPEN CUT
 - PB PIPE BURSTING
 - ▶ RIG PULLING DIRECTION

REV	DATE	ISSUED FOR INFORMATION	BY	STAT	CHK	APP
A	04.05.11	ISSUED FOR INFORMATION	RW	1	TC	

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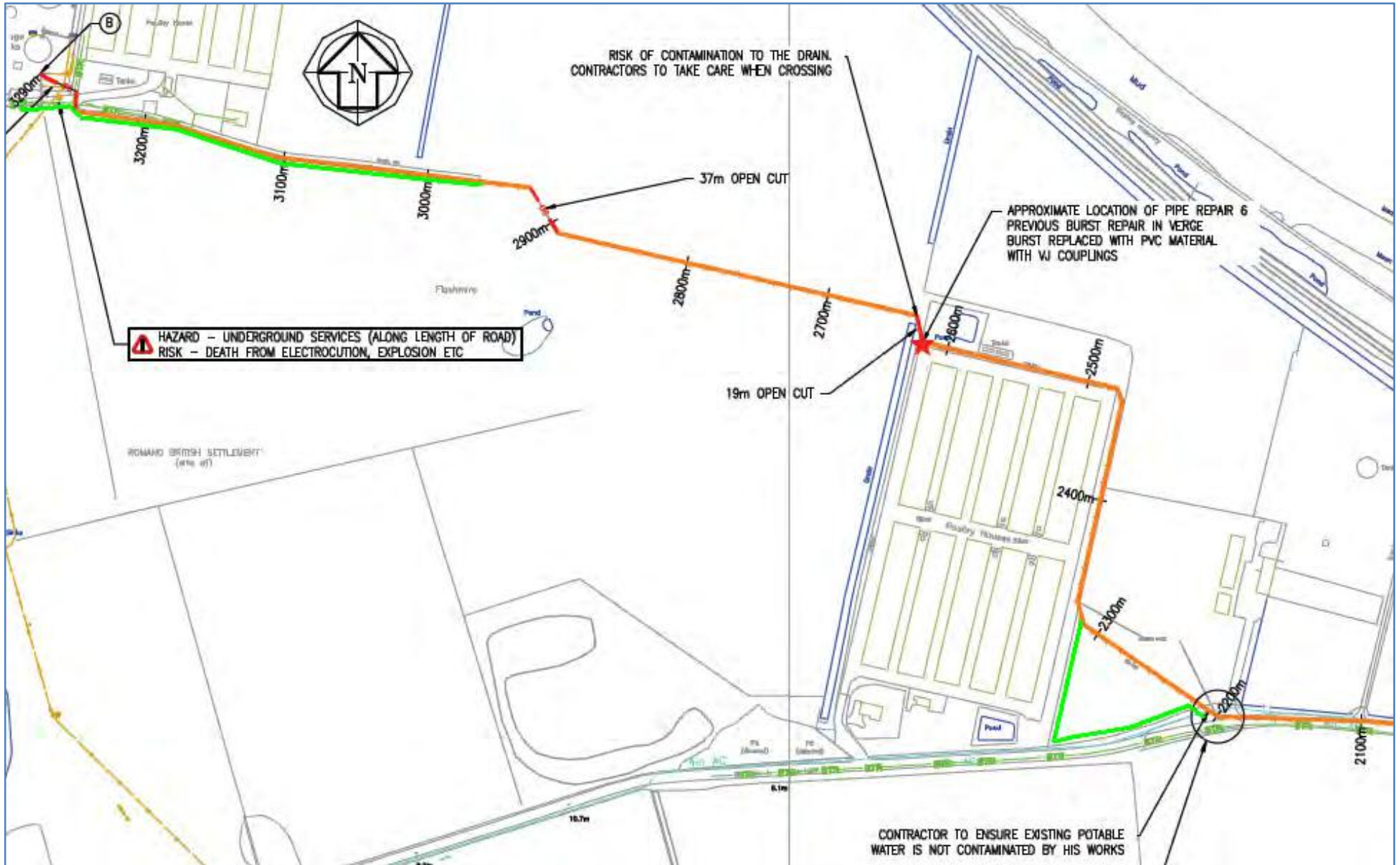
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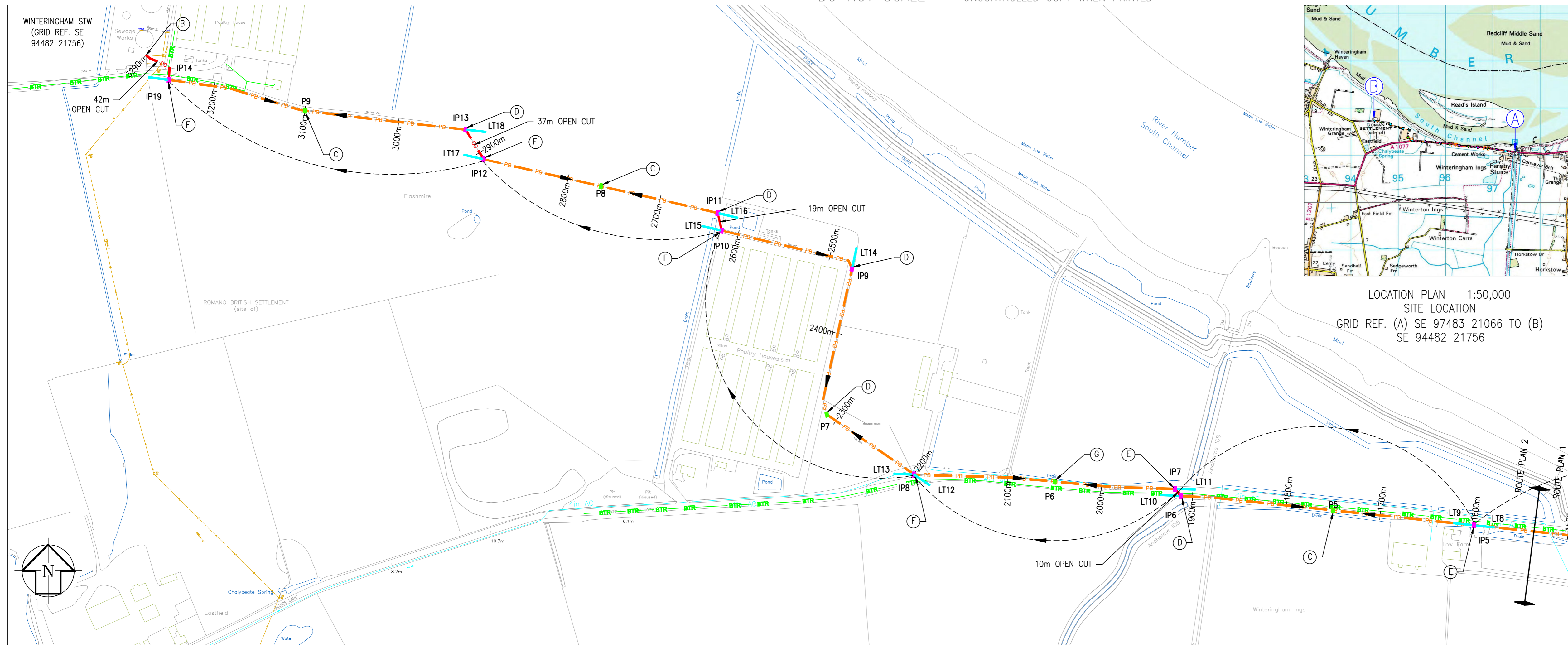
PROJECT TITLE
**SOUTH FERRIBY
ST ANDREWS LANE TPS
RISING MAIN REPLACEMENT SCHEME**
Pipeline, showing pit and trench locations Fig A3.2

DRAWING TITLE
PIPE BURSTING DETAIL

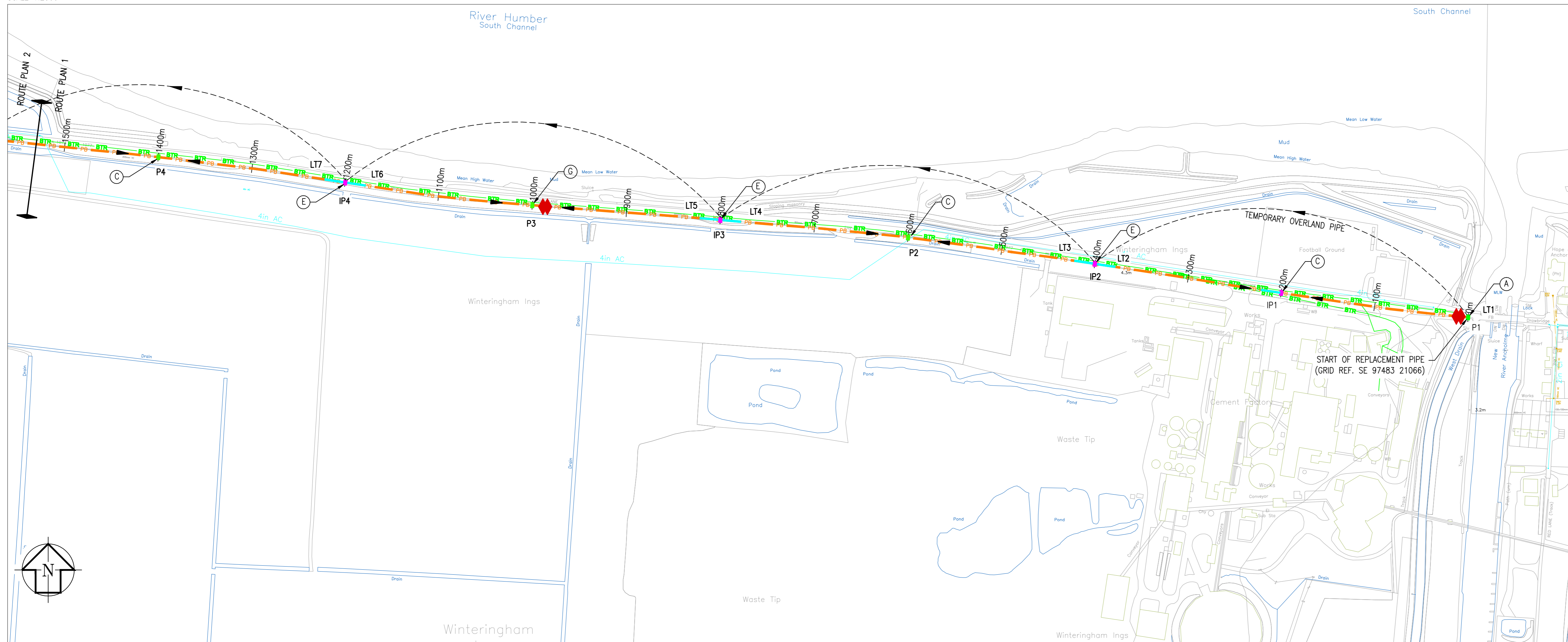
DES'D: SG	DATE: 03.05.11	DRAWN: RW	DATE: 04.05.11	CHK'D: TC	DATE: 04.05.11	APP'D:	DATE:
A1 SCALE: 1:2500		REFERENCED DRAWINGS: SEW-08194-XREF-RMS.dwg SEW-08194-XREF-MAP.dwg					
DRAWING No. SEW-08194-WINTSC-2A-LOC-006							REV. A
							STAT. 1



Pipeline in vicinity of scheduled area, showing vehicle access Fig A3.3

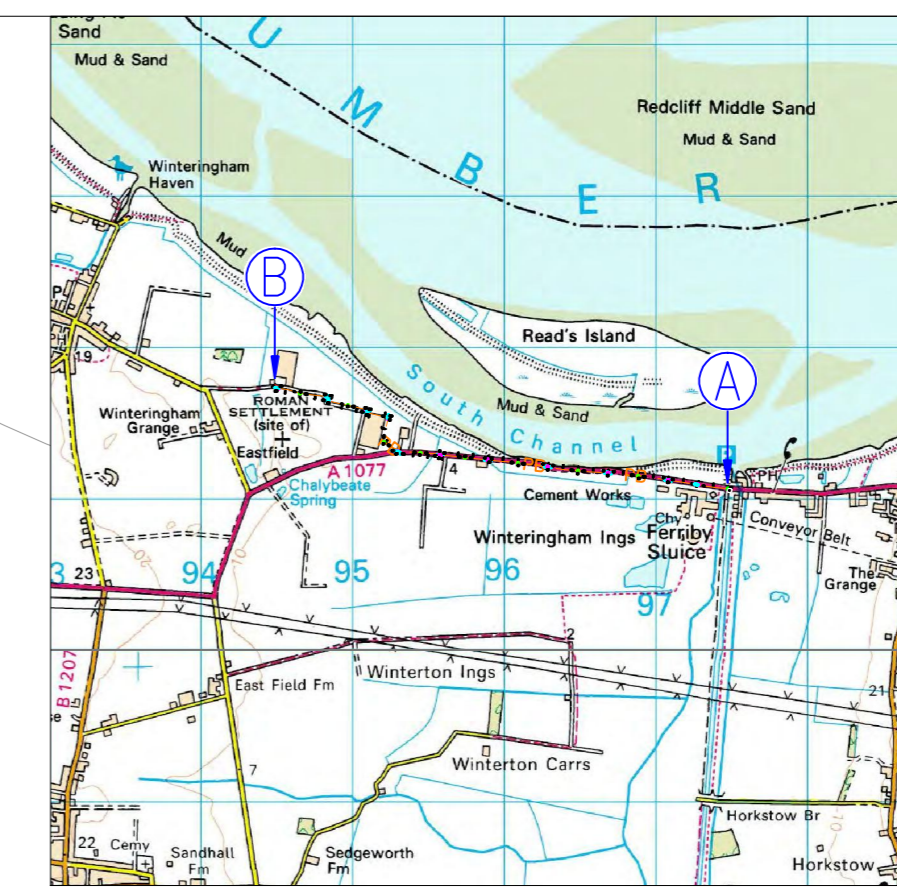


ROUTE PLAN 2
SCALE 1:2500



ROUTE PLAN 1
SCALE 1:2500

Pipeline, pipe bursting detail Fig A3.4



LOCATION PLAN - 1:50,000
SITE LOCATION
GRID REF. (A) SE 97483 21066 TO (B)
SE 94482 21756

- LEGEND**
- P PIPE BURSTING RIG RECEPTION/PULLING PIT (x9)
(2.5m(LENGTH) x 1.5m(WIDTH) x 2m(AVERAGE DEPTH))
 - LT LEAD TRENCH (x19) (10m(L) x 0.6m(W) x 1.25m(AV. DEPTH))
 - IP INSERTION PIT (x14) (2.5m(L) x 1.5m(W) x 2m(AV. DEPTH))
 - OC OPEN CUT
 - PB PIPE BURSTING
 - ▶ RIG PULLING DIRECTION
 - ◊ AIR VALVE
 - ◊ DOUBLE VALVE
 - ◊ REDUCING VALVE
 - ◊ NON RETURN VALVE
 - ◊ METER VALVE
 - ◊ FIRE SLUICE VALVE
 - ◊ WASHOUT HYDRANT VALVE
 - ◊ WASHOUT

- PIPE BURSTING SEQUENCE**
1. TURN OFF PUMPS, TANKER AWAY, CUT PIPE, DRAIN DOWN, FIX FITTINGS AND OVERLAND BY PASS PIPEWORK, RESTART PUMPS.
 2. PIPE BURST 200m LENGTH AND PULL IN NEW PIPE. PIPE BURST THE REMAINING 200m PIPE. REMOVE RIG, CONNECT NEW PIPEWORK TOGETHER AND TEST CONNECTION TO EXISTING PIPEWORK.
 3. TURN OFF PUMPS, TANKER AWAY, DIG DOWN ON NEXT INSERTION PIT IP3. DRAIN DOWN, FIX FITTINGS.
 4. MOVE OVERLAND BYPASS PIPEWORK TO NEXT 400m SECTION AND CONNECT.
 5. OPEN SLUICE VALVE, TURN ON PUMPS.
 6. REPEAT PROCEDURES AS ABOVE.

- NOTES**
1. ALL WORKS AS PER THE LATEST RELEVANT BRITISH STANDARDS, CODES OF PRACTICE AND LEGISLATION.
 2. THE INFORMATION SHOWN ON THIS DRAWING IS BASED UPON THE BEST AVAILABLE INFORMATION BUT THE POSITION MUST BE REGARDED AS APPROXIMATE.
 3. THE ACTUAL POSITION OF ALL APPARATUS MUST BE ESTABLISHED ON SITE BEFORE ANY MECHANICAL PLANT IS USED.
 4. A DESIGN RISK ASSESSMENT HAS BEEN COMPLETED FOR THIS SCHEME.
 5. REFER TO DRAWING No. SEW-08194-WINTSC-2A-DET-020 & 021 FOR CONNECTION DETAILS.

FOR INFORMATION ONLY
08.09.11

REV	DATE	DETAILS	STAT	CHK	APP
A	04.05.11	FOR CONSTRUCTION	2		

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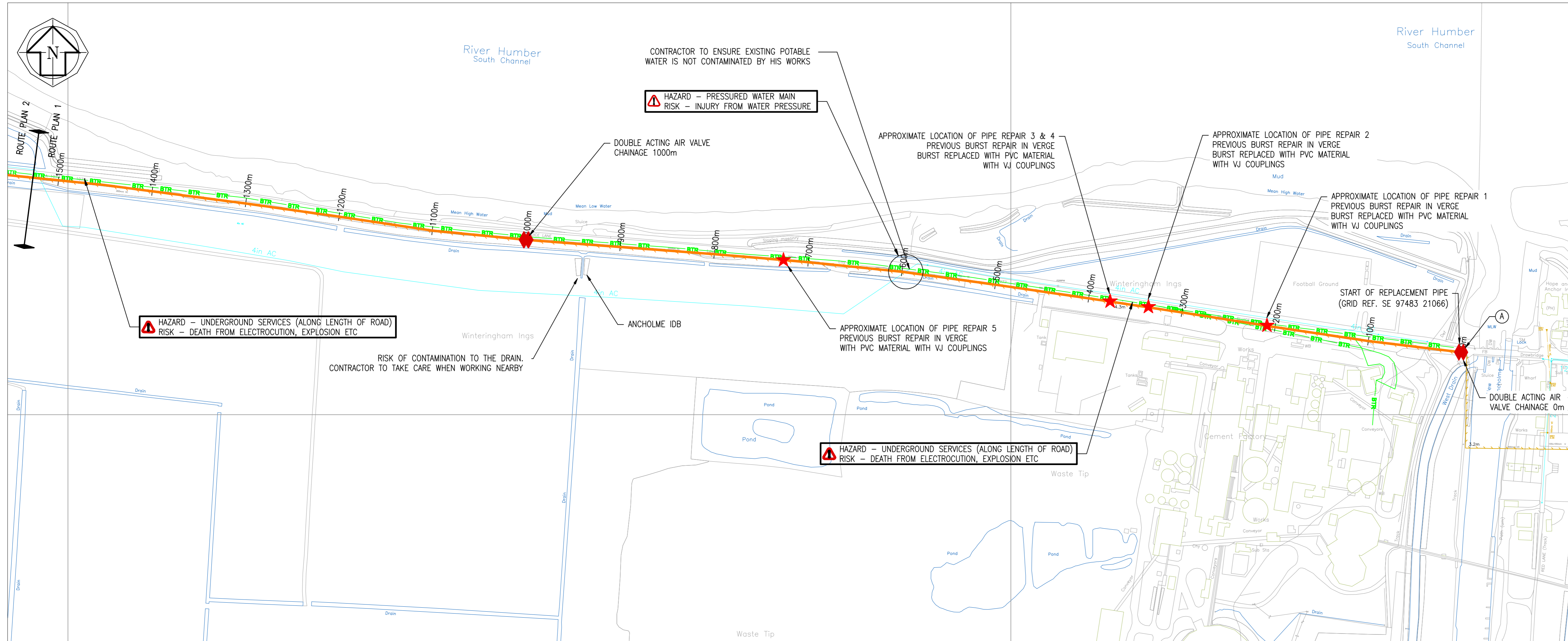
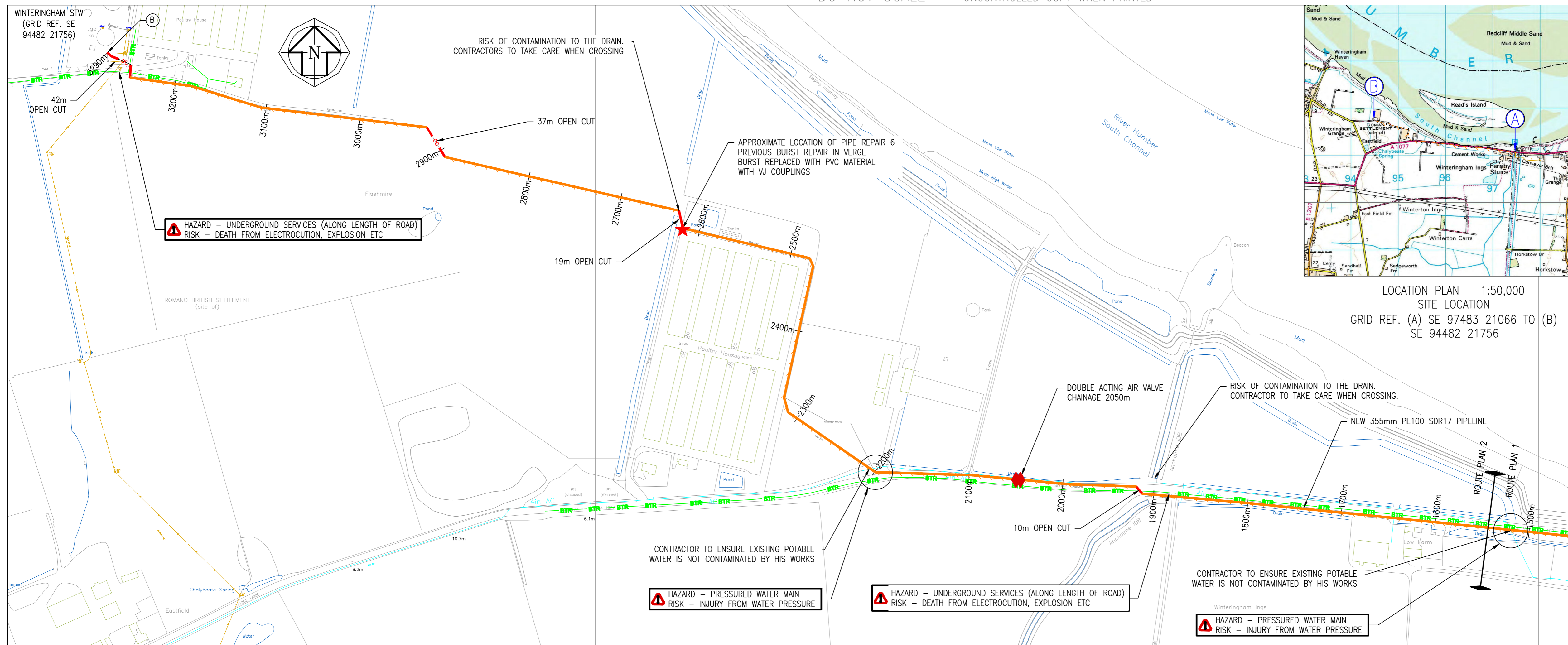
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PROJECT TITLE
SOUTH FERRIBY
RISING MAIN REPLACEMENT SCHEME
PIPELINE BY PIPE BURSTING

DRAWING TITLE
PIPE BURSTING DETAIL

DES'D: XL	DATE: 03.05.11	DRAWN: RW	DATE: 04.05.11
CHK'D: TC	DATE: 04.05.11	APP'D:	DATE:
A1 SCALE: 1:2500	REF DWGS: SEW-08194-XREF-RMS SEW-08194-XREF-MAP		
DRAWING No. SEW-08204-TIPTSC-2A-LOC-006	A	REV. 2	STAT. 2



Pipeline, showing underground services Fig A3.5

LEGEND

- GRAVITY SURFACE
- GRAVITY FOUL
- GRAVITY COMBINED
- POTABLE WATER MAIN
- DECOMMISSIONED WATER MAIN
- EXISTING RISING MAIN ROUTE FROM RECORDS
- APPROXIMATE RISING MAIN ROUTE
- OPEN CUT
- CONNECTION DETAIL
- PIPE BURSTING ENTRY/RECEIVER PITS
- BTR - BT (FROM RECORDS)
- ER - ELECTRIC (FROM RECORDS)
- GR - GAS (FROM RECORDS)
- O/H ELECTRIC (FROM RECORDS)
- O/H BRITISH TELECOM (FROM RECORDS)
- BURST REPAIR LOCATIONS

HEALTH & SAFETY INFORMATION

- AIR VALVE
- DOUBLE REDUCING VALVE
- NON RETURN VALVE
- METER VALVE
- FIRE HYDRANT VALVE
- SLUICE VALVE
- WASHOUT VALVE
- HYDRANT WASHOUT

- HEALTH & SAFETY INFORMATION**
- CARE MUST BE TAKEN WHEN WORKING NEAR UNDERGROUND ELECTRICITY CABLES, TELEPHONE CABLES ETC. EXACT LOCATION SHOULD BE CONFIRMED BEFORE EXCAVATIONS.
 - PROPER TRAFFIC MANAGEMENT TO BE EMPLOYED TO WORK ALONG BUSY A1077 ROAD.
 - THE NO. OF PITS AND THEIR DIMENSIONS SHOULD BE KEPT TO A MINIMUM. THE PITS SHALL NOT EXCEED 2.0m DEPTH. CONTRACTORS TO PROVIDE SUITABLE TRENCH SUPPORT.
 - WORKING WITH SEWAGE - WORKERS TO RECEIVE INFORMATION INSTRUCTION AND TRAINING (EG HSE CARD INDG197) ABOUT GOOD HYGIENE (WASHING HANDS BEFORE EATING, SMOKING ETC)

- NOTES**
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 - THE INFORMATION SHOWN ON THIS DRAWING IS BASED UPON THE BEST AVAILABLE INFORMATION BUT THE POSITION MUST BE REGARDED AS APPROXIMATE.
 - THE ACTUAL POSITION OF ALL APPARATUS MUST BE ESTABLISHED ON SITE BEFORE ANY MECHANICAL PLANT IS USED.
 - A DESIGN RISK ASSESSMENT HAS BEEN COMPLETED FOR THIS SCHEME.
 - REFER TO DRAWING No. SEW-08194-WINTSC-2A-LOC-020 FOR PIPE BURSTING DETAILS.

FOR INFORMATION ONLY

08.09.11

REV	DATE	DETAILS	STAT	CHK	APP
E	05.09.11	ISSUED FOR CONSTRUCTION	2		
P4	04.05.11	PIT LOC. & DIRECTIONAL DRILL ROUTE AMENDED	FI		
P3		ROUTE AMENDED	FI		
P2		ROUTE AMENDED	FI		
P1	01.06.10	FOR INFORMATION	FI		

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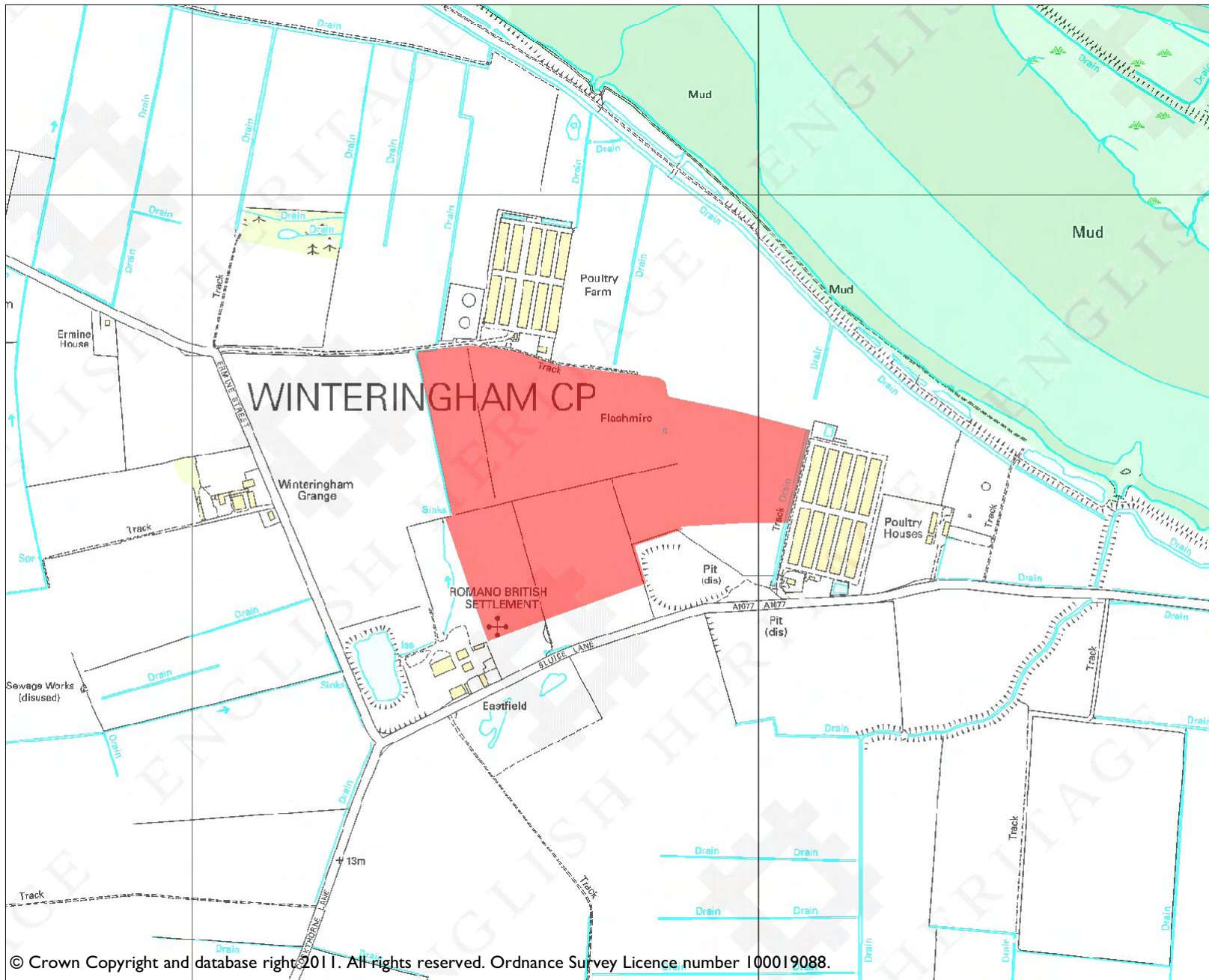
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PROJECT TITLE
SOUTH FERRIBY
RISING MAIN REPLACEMENT SCHEME
PIPELINE BY PIPE BURSTING

DRAWING TITLE
LAYOUT PLAN - 355mm PE100 SDR17
PIPELINE BY PIPE BURSTING

DES'D: XL	DATE: 01.06.10	DRAWN: BB	DATE: 01.06.10
CHK'D: TC	DATE: 04.05.11	APP'D:	DATE:
A1 SCALE: 1:2500	REF DWGS: SEW-08194-XREF-RMS SEW-08194-XREF-MAP		
DRAWING No. SEW-08194-TIPTSC-2A-LOC-001	REV. E	STAT. 2	



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Heritage Category: Scheduling
List Entry No : 1005243

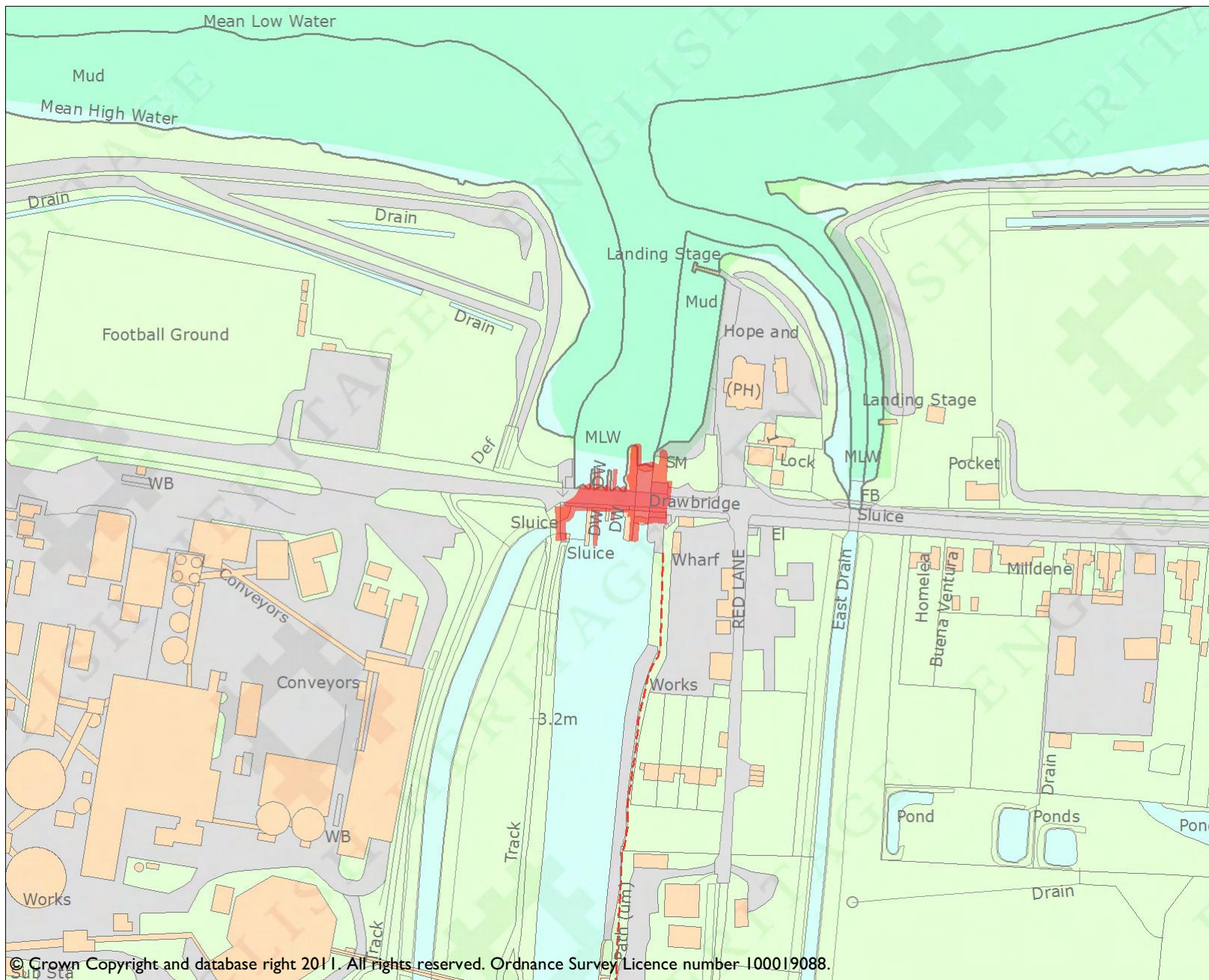
County:
District: North Lincolnshire
Parish: Winterringham

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List Entry NGR: SE 94742 21490
Map Scale: 1:10000
Print Date: 16 November 2011

Name: Old Winterringham Roman settlement



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Name: Ferriby sluice

Heritage Category:

Scheduling

List Entry No :

1005244

County:

District: North Lincolnshire

Parish: South Ferriby

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List Entry NGR:

SE 97514 21066

Map Scale:

1:2500

Print Date:

16 November 2011



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Northamptonshire
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